Dec 1st, 12:00 AM

Asian Soybean Rust in the U.S.: One Year and Counting

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Introduction

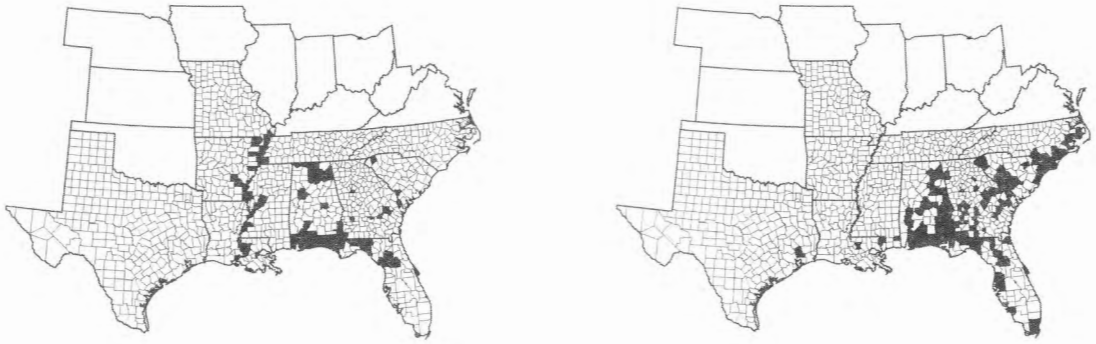
Asian soybean rust is caused by the fungus Phakopsora pachyrhizi. This disease can seriously reduce soybean yields and/or significantly increase the cost of soybean production when the disease occurs with high incidence and severity.

Asian soybean rust was first identified in Japan in 1902. The pathogen moved throughout Asia, Australia, and Africa throughout the 1900s before it was discovered in South America in 2000. In November 2004, Asian soybean rust was first discovered in the U.S. in Louisiana. At the time of the initial discovery of this disease in the U.S., most of the commercial soybean fields in the country were harvested. Nonetheless, additional Asian soybean rust infections were discovered on soybean and kudzu, the primary weed host for this fungus, in seven additional U.S. states in 2004 (Figure 1).

Current Status

The first infection of Asian soybean rust discovered in the U.S. in 2005 was on kudzu at a location north of Tampa, Florida, on February 24, 2005. On April 27, 2005, the disease was first observed on a volunteer soybean plant in Georgia. After observing the infected plant for a few weeks, researchers destroyed the infected soybean plant. The first incidence of Asian soybean rust on planted soybeans was in a sentinel plot in Alabama on June 28, 2005. Sentinel plots are small (usually 30 foot by 30 foot) plots of early planted soybeans that are intensively scouted several times per week for early detection of the disease.

Asian soybean rust was not found in a commercial soybean field in 2005 until July 12 in Alabama. During the month of July, rust was found for the first time in 10 new counties in the U.S., it was discovered in 35 new counties in August, 10 new counties in September, 44 new counties in October, and 9 new counties at the time this paper was prepared in November 2005. The states in which Asian soybean rust was discovered in the U.S. so far in 2005 are Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Texas (Figure 1). The disease was identified in Missouri and Tennessee in 2004 but has not been found in these states so far in 2005.



2004 2005

Figure 1. Counties in the U.S. in which Asian soybean rust was discovered in 2004 and as of November 6, 2005.

Other Lessons Learned in 2005

The factors that were anticipated to affect development of Asian soybean rust – namely the overwinter survival of the fungus, the timing, amount, and location of spore dispersal once the growing season begins, and the local weather conditions upon introduction of spores – seem to have influenced the development of Asian soybean rust in the U.S. in 2005. The rust-infected soybeans that were discovered in 2005 were in the R3 to R6 growth stages. And in most cases, when Asian soybean rust was discovered on soybeans in 2005, the incidence (number of infected plants) and severity (amount of disease on infected plants) of the disease were low.

According to soybean pathologists in the southern U.S., it appears that only one field, in Escambia County, Florida, appears to have had enough disease to have had significantly reduced yield. Fungicides were used in many states in the southern U.S. for management of the disease in 2005. Preventative and curative fungicide sprays were recommended and applied to soybean fields in Alabama, Florida, Georgia, Mississippi, and South Carolina. Despite reports of Asian soybean rust infections in many counties throughout the southeastern U.S., fungicide applications were not recommended by plant pathologists in Arkansas, Kentucky, North Carolina, Tennessee, and Texas. Fungicides are often applied to soybeans in Louisiana for control of other foliar diseases, so it is not certain what additional fungicide applications occurred for management of Asian soybean rust.

Summary

Asian soybean rust did not significantly reduce soybean yields in the U.S. in 2005, surprising many in the soybean industry. But despite the low impact of the disease on U.S. soybean yields in 2005, risks remain. Asian soybean rust will be a threat to U.S. soybean production in 2006 and for years to come. And it remains to be seen how frequently the disease develops to damaging levels in the southern U.S. as well as in the major soybean-producing region, the Midwest.